Report On

ENGINEERING WATER CODE STUDIES FOR THE SOUTH PLATTE RIVER

Under Authorization of Senate Bill 407

46th Colorado General Assembly

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From an engineering standpoint the problem is one of "systems analysis." As in any system, whether it be mechanical, electrical, or hydrogeological, it can be considered in three parts: (1) inputs and/or withdrawals of energy, matter, etc.; affecting (2) a system of interrelated and interacting elements to (3) produce responses which are of interest. In a hydrogeological system, there are inputs and withdrawals of water which vary both in time and location, and are the results of both natural and man-made conditions. The predictability of the inputs and withdrawals is dependent upon many factors and must be considered in terms of a probability based upon historical experience rather than a set figure.

The pertinent elements of the system include hydraulic and geometric characteristics of the groundwater-surface water system which affect the location and movement of water in the system. Responses of the system which are of interest include changes in groundwater levels and interchange of water between the aquifer and the stream.

GENERAL SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Based upon the detailed studies which have been made during the last year under authority of Senate Bill 407, certain findings, conclusions, and recommendations stand out as being particularly pertinent. These are set forth below.

Findings

1. The average annual water supply within the South Platte River Basin is adequate to meet present requirements. However, because of the wide fluctuations in runoff, the distribution of water availability is far from satisfactory.

2. The groundwater reservoir along the main stem of the South Platte River between Denver and the State line contains approximately ten million acre-feet of water. Only a small percentage of this capacity is utilized and this only in a haphazard and unplanned way.

3. Groundwater pumping and transmountain importations have been major factors in stabilizing water supplies in the South Platte Basin. However, the pumping of groundwater has caused infringement upon prior surface water rights. Studies indicate that this infringement is not as severe as many have felt it to be.

4. The water supplies of the South Platte Basin are not being utilized or administered as efficiently and effectively as they could be.

5. Deficiencies exist in the completeness and accuracy of water use records.

Conclusions

1. Planned utilization of 10 to 15 percent of the available groundwater storage capacity in the alluvium is reasonably attainable. Use of the groundwater storage capacity can provide more efficient utilization of the total resources of the Basin, reduce shortages, and minimize conflicts between water users. This planned utilization in conjunction with surface water supplies would basically involve a heavier draft upon the groundwater supplies during low runoff years with provision for replenishment of those supplies during years of surplus runoff.

2. To achieve more optimum distribution of water supplies and accomplish desired goals, certain surface water rights should be served from groundwater sources during low runoff periods. Such operations would allow more surface water to be diverted in the upper regions, making greater re-use of return flows possible.

3. Since the groundwater in storage adjacent to the main stem of the South Platte River is currently being used to support the flowing stream, and many users are dependent upon and have rights in the return flow which joins the River via the groundwater system, provisions must be made to protect these rights and to supply them with alternate sources of water to insure the continued utilization of the groundwater supply. The cost of providing such facilities should be borne by those who benefit.

4. Optimum use of water resources within the South Platte Basin cannot be achieved without control of nonbeneficial uses or waste of water.

5. Integrated management of groundwater and surface water can be best achieved on an overall South Platte River Basin basis.

Recommendations

1. It is recommended that legislation should be passed which will allow and encourage the integrated mangement and administration of groundwater and surface water in the South Platte Basin. It is recommended that this be accomplished through the establishment of basin water management districts. The districts should be given specific powers to own and operate well fields, reservoirs, and other facilities.

2. It is recommended that the State Engineer be granted the authority to review and overrule the operational plans of these water management districts and any agreements which may be made. The State Egnineer should continue to have the authority necessary to insure that all vested rights in the Basin are protected.

3. It is also recommended that the State Engineer should have the authority to define waste and beneficial use under the various circumstances and uses and be required to restrict diversions of water not being used beneficially. Water rights should be quantified in terms of acre-feet on the basis of beneficial use.

4. It is recommended that surface water right owners be given the opportunity to obtain alternate points of diversion at wells. Such diversions would be made under the Appropriation Doctrine.

5. It is recommended that immediate steps be taken to improve the completeness, accuracy, storage and retrieval of water measurements and records, utilizing automatic data processing methods wherever possible.

6. It is recommended that the State Engineer be granted administrative power to grant or deny changes in point of diversions, alternate points of diversion and transfers of water between uses and users, provided that investigations indicate that such changes or transfers will not materially injure the vested rights of others. Such decisions should be subject to court review.

SPECIFIC CONCLUSIONS

Each of the four reports covering the South Platte River presented conclusions, some pertaining to the particular District studied and some to the State in general. These conclusions as presented in the individual reports are contained on the following pages, along with general conclusions derived from studies of major tributaries of the South Platte as represented by Water Districts 3, 4, 5, and 6.

Water District 64

The investigations performed relative to water utilization and water availability in the Lower South Platte Valley have resulted in conclusions, some of which would apply to all river basins of the State, and others which apply primarily to the study area. The conclusions are:

1. The present utilization of Colorado's water resources is neither as efficient nor as effective as it should be.

2. Additional water is available which can be put to beneficial use. Large quantities of transient groundwater storage exist along several rivers which can be used to good advantage to help balance out seasonal surface supply variations.

3. The existing use of groundwater by well owners has many uncertain aspects which presently make these supplies undependable.

4. A continued threat exists to owners of vested surface water rights because of uncontrolled and increased well pumping.

5. Water resources and the physical mechanisms for better utilization of water resources exist, or could be constructed, which would provide for a more dependable water supply and/or increased water use.

6. Irrigation of additional lands will tend to decrease the quality of the river water downstream.